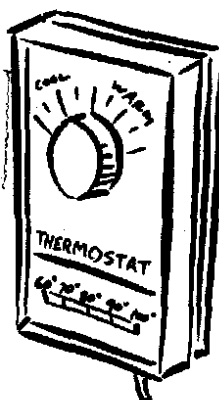


Good Maintenance Ideas

Maintenance Tips

- Ensure that ventilation rates are adequate in accordance with ASHRAE Standard 62-1989 and other applicable standards and codes.
- Cycle on heating, ventilation, and air-conditioning systems in unoccupied rooms at least once daily to interrupt humidity and temperature extremes. This "refresh" cycle is widely available in energy management controls and systems or can be accomplished with a 24-hour timeclock.



- Use the highest efficiency air filters possible as appropriate for each type of air supply system in your facility with a target minimum rating of 65% ASHRAE dust-spot efficiency.
- Obtain and review material safety data sheets (MSDSs) for housekeeping and maintenance supplies to select products which minimize the release of potentially harmful chemicals.
- Review construction, remodeling and renovation plans to select building and finishing materials to minimize toxicity and off-gassing (the tendency of carpets, adhesives, particle board, paints, caulks, etc. to give off harmful chemicals). Use "Low VOC" paints which off-gas less. Consider paints with compounds which retard biological growth.
- Seal the building envelope — roof, exterior walls, foundation and floors — properly to minimize uncontrolled airflow or water leaks.

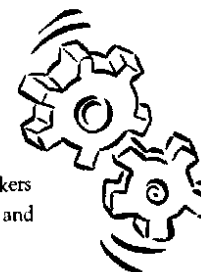
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- Repair roof, piping, and condensate water leaks promptly; completely dry areas within 48 hours; and remove water-damaged materials and items that show any signs of biological growth.
- Keep hot water temperatures above 125°F, even in returns on recirculating systems to help minimize growth of *Legionella* and other bacteria.
- Upgrade outside air intakes to provide conditioned makeup air to offset 90% of exhaust.
- Manage air-pressure relationships between adjacent areas carefully; avoid excessive unbalanced exhaust and the resulting uncontrolled air flow.

Pesticides

Extreme care should be taken to minimize pesticide use and to apply necessary pesticides at the time of day which minimizes potential exposure of occupants. Here are some specific ideas.

- Discourage pests through housekeeping and maintenance measures. Properly used, substances like boric acid or diatomaceous earth can reduce the need for more toxic substances.
- Schedule pesticide applications carefully and notify workers in affected areas. Make provisions to minimize workers' and guests' exposures.



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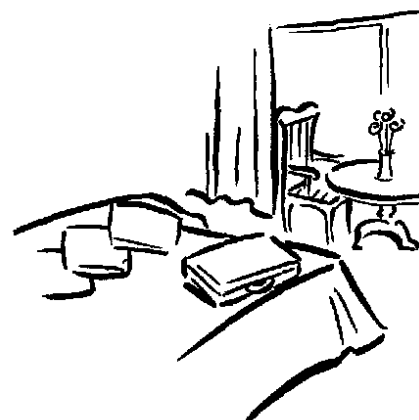


Good Maintenance Ideas

- Use maximum ventilation for at least 24 hours after pesticides are applied.
- Always follow manufacturer's instructions on handling and use of pesticides.
- Train all personnel handling any pesticides thoroughly as is required by law.

S E C T I O N

PROPER VENTILATION FOR GUEST ROOMS

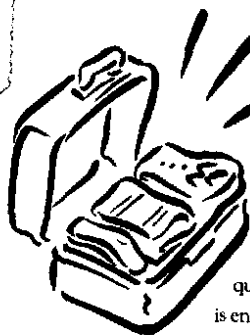


Proper Ventilation for Guest Rooms

Guest room ventilation requirements are established by the volume of air removed from the space by the bathroom exhaust. Bathroom exhaust pulls air from the room itself and, unless this is properly offset with makeup air, the room is negatively pressurized. This means the room draws in air from wherever it can to replace the lost exhaust air. The resulting uncontrolled airflow is at the heart of many hotel and motel IAQ problems.

Systems that use package terminal air conditioning units (PTACs) present special problems for managing outdoor air supplies and pressure relationships. For instance, many PTACs are equipped with wall caps to make up outside air. But when the bathroom exhaust is running and the PTAC cycles off, unconditioned air rushes in the open cap. In the summer, this

introduces heat and moisture. In the winter, in addition to uncomfortable drafts, this can lead to condensation on surfaces surrounding the wall cap.



Room PTACs also present maintenance problems that require routine attention. Standing water in pans, saturated equipment lining, and water damage from overflow contribute to air-quality problems. Proper drainage of condensate pans is ensured by proper pitch and correct P-trap construction.

Some bathroom exhaust systems don't function due to inadequate installation or, in many cases, fan blades so dirty that they no longer move air. The resulting moisture build-up from showers encourages growth of mold and bacteria in the bathroom. Proper installation, maintenance, and cleaning of bathroom exhausts costs far less than removing the mold and bacteria, recaulking, or replacing wall tiles and fixtures.

Defective bathroom exhaust or leaking exhaust ducts above the ceiling can pull outside air into wall cavities, where moisture can condense and encourage the growth of harmful and destructive fungus. Remediation of biological growth in wall cavities often means demolition and renovation.

The air removed by the bathroom exhaust will be replaced by air that comes from an outdoor air makeup supply, through a hallway, or through interior wall cracks and openings. Conditioned or tempered air should be supplied directly or through corridors, where possible, to help offset room pressure imbalances. Sealing guest room glazing, electrical outlets, and other sources of infiltration helps control airflow too. Where permissible and practical, timer switches for guest control of individual bathroom exhaust fans are very effective.

The location and quantity of air supply and exhaust determine the boundaries of the area that is affected by an HVAC system, often called a zone. Airflow direction and pressure relationships across zone boundaries determine in large part whether odors from one zone will spread to others or be contained. Zones can be used to manage indoor air conditioning and control of odors.

The zone concept is the single most valuable tool in managing non-smoking and smoking sections for hallways and public areas. Areas set aside for non-smoking customers should have a distinct zone apart from areas used by smokers. The pressure relationships and airflow direction between these zones can be used to keep smoke from drifting into non-smoking areas. Where blocks of guest rooms are set aside for non-smoking or smoking customers, the zone concept can be used to control odors and smoke drift.



SECTION

AN
IAQ PLANNING
CHECKLIST



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An IAQ Planning Checklist

Managing indoor air quality requires planning, just like managing any aspect of a business. Much of the information you'll need for IAQ management planning is already available from other plan documentation requirements, like the occupancy plan you need for fire safety reasons. This Technical Bulletin provides a concise, easy-to-use planning reference. Here's an outline of a plan you can use as a checklist in starting your IAQ program.

1. **Identify IAQ-related building systems.** Make a copy of a building floor plan. Sit down with the person responsible for operations and maintenance of the building to look at IAQ factors. Mark up the floor plan with the location of each mechanical room, each outdoor air intake, and each air-handling system and the areas served by each. Mark the location of exhausts from the kitchen, laundry and any flues or chimneys from boilers or fireplaces. Mark the location of any cooling towers.
2. **Develop a facility-use plan.** Make an additional copy of the marked version of the floor plan. On the first copy, use a colored marker to identify the uses of various areas of the building, such as sleeping rooms, restaurant areas, bar or lounge areas, general public areas (e.g. reception, lobby), conference areas, or indoor recreation areas (e.g. pool, fitness center).
3. **Develop an accommodation plan.** Mark a copy of the facility-use plan with the areas that are designated for non-smoking and smoking. Non-smoking areas may include general-use areas, such as fitness centers and floors designated for non-smokers. Smoking areas often include sections of food and beverage service spaces, portions of main and conference area lobbies, and selected lounge areas. Many facilities find it useful to designate non-smoking and smoking guest rooms as well.

In each instance, the selection of the non-smoking and smoking areas should be made with reference to the layout of the air-handling systems to minimize the drift of smoke from smoking into non-smoking areas. Check the accommodation plan for consistency with any state or local laws, ordinances, or regulations that may apply to the facility.

4. **Develop an IAQ housekeeping checklist.** Ask the person responsible for housekeeping at your facility to review this booklet and develop a standardized checklist of IAQ housekeeping items to apply in his or her daily or weekly housekeeping quality control inspection program. You should review the results of the IAQ housekeeping inspection at least once a month.
5. **Develop an IAQ maintenance checklist.** Ask the person responsible for operations and maintenance of the facility to review this booklet and develop a system-by-system checklist of IAQ maintenance points. Include it in the seasonal inspection of the HVAC equipment and building conditions. You should review the results of the IAQ maintenance checklist inspection with the person who conducted the inspection.
6. **Develop an IAQ complaint log.** Set up a logging procedure for the manager on duty that highlights IAQ complaints and presents them in a systematic way to you. The complaint log should be reviewed with the individuals responsible for operations and maintenance and for housekeeping at least twice a year, in conjunction with the review of the IAQ maintenance checklist. If there are frequent complaints, inspections and reviews should be increased until problems are resolved.



An IAQ Planning Checklist

IAQ Standards, Laws, and Regulations

Professional Standards

The most significant and comprehensive guidance document on indoor air quality today is the IAQ standard developed by the American Society of Heating, Refrigeration, and Air-Conditioning Engineers, "Ventilation for Acceptable Indoor Air Quality" (ANSI/ASHRAE Standard 62-1989). This standard provides the basis for many building codes in the U.S. and elsewhere in the world. It is also generally viewed as the standard of care for design and operation of buildings with regard to IAQ. This standard is in a regular review cycle and is updated periodically. Additional standards in indoor air quality can be expected to emerge from current U.S. and international standard-setting activities.

State and Local Government Standards

In the United States, state and local governments in some jurisdictions have passed laws relating to indoor air quality. These laws vary widely in their scope and applicability, all the way to the municipal level. These laws and ordinances are typically enforced by public health departments, which can provide information specific to the jurisdiction in which you operate your facility. In addition, many local jurisdictions have adopted portions of ASHRAE Standard 62-1989 into their building codes, particularly regarding incoming outdoor air requirements. These requirements typically apply to construction and renovation projects. You should familiarize yourself with them to help plan for compliance and minimize cost impacts.

Federal IAQ Activities

In the United States there is currently no specific legislation at the federal level that addresses the broad issues of indoor air quality. Federal regulations relating to indoor air quality for the protection of non-industrial workers have been proposed by the Occupational Health and Safety Administration (OSHA), but remain in draft form at press time. The U.S. Environmental Protection Agency (EPA) has pursued research and information programs for several years and provides information and technical reports. However, EPA does not regulate indoor air quality.



The Accommodation Program New York, New York

The Accommodation Program recognizes that successful businesses in the hospitality industry are dedicated to the concepts of superior customer service and the accommodation of all guests and patrons.

Therefore, The Accommodation Program has made a commitment to develop and provide comprehensive training resources and materials to help businesses implement plans for effectively designating non-smoking and smoking areas in their establishments. All materials are provided free-of-charge, courtesy of Philip Morris Incorporated.

A step-by-step source book offers customer service tips and valuable information on seating, dining and guest room configurations, as well as on proper operation and maintenance of heating, ventilation and air conditioning systems. Program signage can be used to display the business's policy of accommodation, as well as to designate separate non-smoking and smoking sections.

More than 25,000 businesses nationwide participate in The Accommodation Program. Participants have found that accommodating all guests — non-smokers and smokers alike — is good business.

For more information about The Accommodation Program, or to reorder program materials, please call 1-800-929-1414.



The Accommodation Program
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The Chelsea Group, Ltd. Itasca, Illinois

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George Benda is the Chairman and Chief Executive Officer of The Chelsea Group. Recently, he has been working on the monitoring and control of indoor environments, a field in which he has contributed several patent-pending inventions. He is also the author of *The Handbook of Indoor Air Quality and Building Management*, among other publications. Mr. Benda holds a master's degree from the University of Chicago and a bachelor of science degree from Rockford College, Rockford, Illinois.

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